In the Claims:

1. (Original) A thermal detection system comprising:

a. a temperature sensing element (TSE) that includes an electro-optic (EO) material layer and characterized by an index of refraction;

b. an electrical mechanism for inducing a change in said index of refraction, said index change correlated with a temperature of said TSE; and

c. an optical reading mechanism for reading said refraction index change, thereby providing a reading of said TSE temperature.

2. (Original) The thermal detection system of claim 1, wherein said EO layer has a length axis, and wherein said optical reading mechanism includes a laser beam configured to propagate through said EO layer in a direction substantially along said length axis, and a power meter for reading a change in the intensity of said laser beam after said beam exits said EO layer, said intensity change correlated with said refraction index change and said TSE temperature.

3. (Original) The thermal detection system of claim 1, further comprising an absorbing layer attached to said EO layer, whereby radiation emitted by a remote body and absorbed in said absorbing layer determines said TSE temperature.

4. (Original) The thermal detection system of claim 3, wherein said radiation is infrared radiation.

5. (Original) The thermal detection system of claim 1, further comprising a thermal link connecting said EO layer to a thermally conducting substrate that serves as a heat sink, and a temperature controller connected to said substrate and used for setting said substrate temperature.

6. (Original) The thermal detection system of claim 1, wherein said EO material is a ferroelectric material.

7. (Original) The thermal detection system of claim 6, wherein said ferroelectric material is in the paraelectric phase.

8. (Original) The thermal detection system of claim 2, wherein said optical reading mechanism further includes a cross-polarizers configuration of two polarizers positioned on two sides of said TSE along said length axis, said polarizers configured to manipulate said laser beam in order to provide said intensity change.

9. (Original) The thermal detection system of claim 2, further comprising a parallel dummy immune to radiation induced temperature changes positioned in parallel with said TSE, wherein said optical reading mechanism further includes a Mach Zehnder Interferometer (MZI) reading configuration.

10. (Original) The thermal detection system of claim 8, further comprising a parallel dummy immune to radiation induced temperature changes positioned in parallel with said TSE between said two polarizers, wherein said optical reading mechanism includes a first beam propagating through said TSE and a second beam propagating through said parallel dummy, and means to obtain output light intensity measurements based on said two beams and correlated with said TSE temperature through said index of refraction change.

11. (Original) The thermal detection system of claim 9 wherein said MZI reading configuration includes a splitter for splitting said laser beam into two beams, a reading beam propagating through said TSE and a reference beam propagating through said parallel dummy, and means to obtain a combined output light intensity measurement

based on said two beams and correlated with said TSE temperature through said index of refraction change

12. (Original) The thermal detection system of claim 10, wherein said parallel dummy includes an EO material different from said TSE EO material.

13. (Original) The thermal detection system of claim 11, wherein said parallel dummy includes an EO material different from said TSE EO material.

14. (Original) The thermal detection system of claim 2, further comprising an optional calibrating mechanism connected in series with said TSE and used for calibrating said light intensity.

15. (Original) The thermal detection system of claim 14, wherein said calibrating mechanism is selected from the group consisting of a phase compensator and a serial dummy.

16. (Original) A thermal detection system comprising:

a. a temperature sensing element (TSE) that includes an electro-optic (EO) material layer having a length axis and characterized by an index of refraction;

b. an electrical mechanism for inducing a change in said index of refraction, said index change corresponding to a temperature of said TSE;

c. an optical reading mechanism that includes a laser beam propagating through said EO layer along said length axis and having a light intensity that changes as a result of said refraction index change; and

d. a power meter for measuring said light intensity change, whereby said detected light intensity change indicates said temperature of said TSE.

17. (Original) The thermal detection system of claim 16, further comprising an

absorbing layer attached to said EO layer, whereby radiation emitted by a remote body and absorbed in said absorbing layer determines said TSE temperature.

18. (Original) The thermal detection system of claim 17, wherein said radiation is infrared radiation.

19. (Original) The thermal detection system of claim 16, further comprising a thermal link connecting said EO layer to a thermally conducting substrate that serves as a heat sink, and a temperature controller connected to said substrate and used for setting said substrate temperature.

20. (Original) The thermal detection system of claim 16, wherein said EO material is a ferroelectric material.

21. (Original) The thermal detection system of claim 20, wherein said ferroelectric material is in the paraelectric phase.

22. (Original) The thermal detection system of claim 16, further comprising a cross-polarizers configuration of two polarizers positioned on two sides of said TSE along said length axis, said polarizers configured to manipulate said laser beam in order to provide said intensity change.

23. (Original) The thermal detection system of claim 16, further comprising a parallel dummy immune to radiation induced temperature changes positioned in parallel with said TSE in a Mach Zehnder Interferometer (MZI) reading configuration, said laser beam split by a splitter into a reference beam propagating through said parallel dummy and means to obtain a combined output light intensity measurement based on said two beams and correlated with said TSE temperature through said index of refraction change.

24. (Original) The thermal detection system of claim 22, further comprising a parallel dummy immune to radiation induced temperature changes positioned in parallel with said TSE between said two polarizers, and an additional laser beam propagating through said parallel dummy, and means to obtain output light intensity measurements based on said two beams and correlated with said TSE temperature through said index of refraction change.

25. (Original) The thermal detection system of claim 23, wherein said parallel dummy includes an EO material different than said TSE EO material.

26. (Original) The thermal detection system of claim 24, wherein said parallel dummy includes an EO material different than said TSE EO material.

27. (Original) The thermal detection system of claim 16, further comprising an optional calibrating mechanism connected in series with said TSE and used for calibrating said light intensity.

28. (Original) The thermal detection system of claim 27, wherein said calibrating mechanism is selected from the group consisting of a phase compensator and a serial dummy.

29. (Original) A thermal imaging system having an array of pixels arranged in columns and rows, the system comprising:

a. a plurality of temperature sensing elements (TSE) each having an electro-optic (EO) material layer and characterized by an index of refraction;

b. an electrical mechanism for inducing a change in said index of refraction of each individual TSE, said refraction index change correlated with a temperature of said individual TSE;

c. a plurality of dummies, wherein said electrical mechanism is applied to a pair composed of a TSE and a dummy; and

d. an optical reading mechanism applied simultaneously to said TSE and said dummy of said pair, to measure their respective refraction index, thereby providing a reading of a temperature difference between said TSE and said dummy.

30. (Original) The thermal imaging system of claim 29, wherein said EO layer has a length axis, and wherein said optical reading mechanism includes a laser beam configured to propagate through said EO layer in a direction substantially along said length axis, and a power meter for reading a change in the intensity of said laser beam after said beam exits said EO layer, said intensity change correlated with said refraction index change.

31. (Original) The thermal imaging system of claim 29, wherein each said TSE further includes a radiation absorbing layer attached to said EO layer, whereby radiation emitted by a remote body and absorbed in said absorbing layer determines said individual TSE temperature.

32. (Original) The thermal imaging system of claim 31, wherein said radiation is infrared radiation.

33. (Original) The thermal imaging system of claim 29, wherein each said TSE further includes a thermal link connecting said EO layer to a thermally conducting substrate that serves as a heat sink, and a temperature controller connected to said substrate and used for setting a substrate temperature.

34. (Original) The thermal imaging system of claim 30, wherein said TSEs are arranged in columns having a common front end and back end, and wherein said optical reading mechanism further includes a cross-polarizers configuration of two polarizers, one said polarizer positioned before said common front end and the other

said polarizer positioned after said common back end of each said column, said polarizers configured to manipulate said laser beam in order to provide said intensity change.

35. (Original) The thermal imaging system of claim 34, wherein said beam includes two beams, one propagating through said TSE and the other propagating through said dummy.

36. (Original) The thermal imaging system of claim 30, wherein said optical reading mechanism further includes a Mach Zehnder Interferometer (MZI) reading configuration in which a splitter splits said laser beam into two beams that propagate respectively through said TSE and said dummy of said pair, and means to obtain a combined output light intensity measurement based on said two beams and correlated with said TSE temperature through said index of refraction change.

37. (Original) The thermal imaging system of claim 35, wherein said pair includes a dummy adjacent to said TSE.

38. (Original) The thermal imaging system of claim 36, wherein said pair includes a dummy adjacent to said TSE.

39. (Original) A method for radiation sensing comprising the steps of:

a. providing a temperature sensing element (TSE) that includes an electro-optic (EO) material layer and characterized by an index of refraction;

b. exposing said TSE to radiation, thereby affecting the temperature of said EO material;

c. electrically inducing a change in said index of refraction, said change correlated with said TSE temperature; and

d. optically reading said refraction index change, thereby providing a reading of said TSE temperature.

40. (Original) The method of claim 39, wherein said radiation is IR radiation.

41. (Original) The method of claim 39, wherein said EO layer has a length axis, and wherein said step of optically reading includes propagating a laser beam through said EO layer in a direction substantially along said length axis, and reading an intensity of said beam after it exits said EO layer, said intensity correlated with said TSE temperature through said refractive index change.

42. (Original) The method of claim 39, wherein said EO material is selected from the group consisting of a paraelectric and a ferroelectric material

43 **[44]** (Amended) The method of claim 41, wherein said step of optically reading further includes positioning two cross-polarizers on two sides of said TSE along said length axis, said polarizers configured to manipulate said laser beam and obtain said intensity reading.

44 **[45].** (Amended) The method of claim 41, wherein said step of optically reading includes reading an intensity change obtained in a Mach Zehnder Interferometer (MZI) reading configuration in which a parallel dummy immune to radiation induced temperature changes is positioned in parallel with said TSE, said laser beam split to sample both said TSE and said dummy.

45 **[46].** (Amended) The method of claim 43, wherein said step of optically reading further includes positioning a parallel dummy immune to radiation induced temperature changes in parallel with said TSE, and wherein said optical reading mechanism includes a first beam propagating through said TSE and a second beam propagating through said parallel dummy, and means to obtain output light intensity

measurements based on said two beams and correlated with said TSE temperature through said index of refraction change.

46 [47]. (Amended) The method of claim 39, further comprising the step of calibrating said light intensity by positioning an optional calibrating mechanism in series with said TSE.

47 [48]. (Amended) The method of claim 39, wherein said calibrating mechanism is selected from the group consisting of a phase compensator and a serial dummy.

48 [49]. (Cancelled)

49 [50]. (Amended) A method for thermal imaging comprising the steps of:

a. providing a plurality of temperature sensing elements (TSE), each said TSE having an electro-optic (EO) material layer and characterized by an index of refraction;

b. providing at least one dummy, wherein said TSEs and said at least one dummy are located in respective adjacent columns;

c. electrically inducing a change in said index of refraction of each said TSE, said refraction index change correlated with a temperature of said TSE; and

d. optically reading each said TSE refraction index change, thereby providing a reading of each said TSE temperature.

50 [51]. (Amended) The method of claim 49 [50], wherein said TSEs and said at least one dummy are arranged in an array of columns and rows, wherein said step of electrically inducing a change includes electrically applying an electric field to an entire row, and wherein said step of optically reading includes optically reading one said TSE and said at least one dummy.

51 [52]. (Amended) The method of claim 50 [51]. wherein said EO layer has a length axis, and wherein said step of optically reading further includes propagating a laser beam through said EO layer in a direction substantially along said length axis, and reading an intensity of said beam after it exits said EO layer, said intensity correlated with said TSE temperature through said refractive index change.

52 [53]. (Amended) The method of claim 49 [50], wherein said EO material is selected from the group consisting of a paraelectric material and a ferroelectric material.

53 [54]. (Amended) The method of claim 51 [52], wherein said TSE columns have a common front end and back end, and wherein said step of optically reading further includes providing a cross-polarizers configuration of two polarizers, one said polarizer positioned before said common front end and the other said polarizer positioned after said common back end of each said column, and wherein said polarizers are configured to manipulate said laser beam in order to obtain said intensity reading.

54 [55]. (Amended) The method of claim 51 [52], wherein said step of electrically inducing a change in said index of refraction includes applying said electrical field to a pair composed of a said TSE and said at least one dummy, and wherein said step of optically reading further includes reading said intensity through a Mach Zehnder Interferometer (MZI) reading configuration.

55 [56]. (Amended) The method of claim 54 [55], wherein said reading through said MZI reading configuration includes splitting said laser beam into two beams that propagate respectively through said TSE and said dummy of said pair, and combining said two beams into an exit beam after they exit said TSE and said dummy, said reading said intensity including reading an intensity of said exit beam.

56 **[57]**. (Amended) The method of claim 53 **[54]**, wherein said pixel pair includes a dummy pixel adjacent to said TSE.